Fall-Grown Oat Offers a Unique Forage Option: High Fiber Digestibility and High Energy

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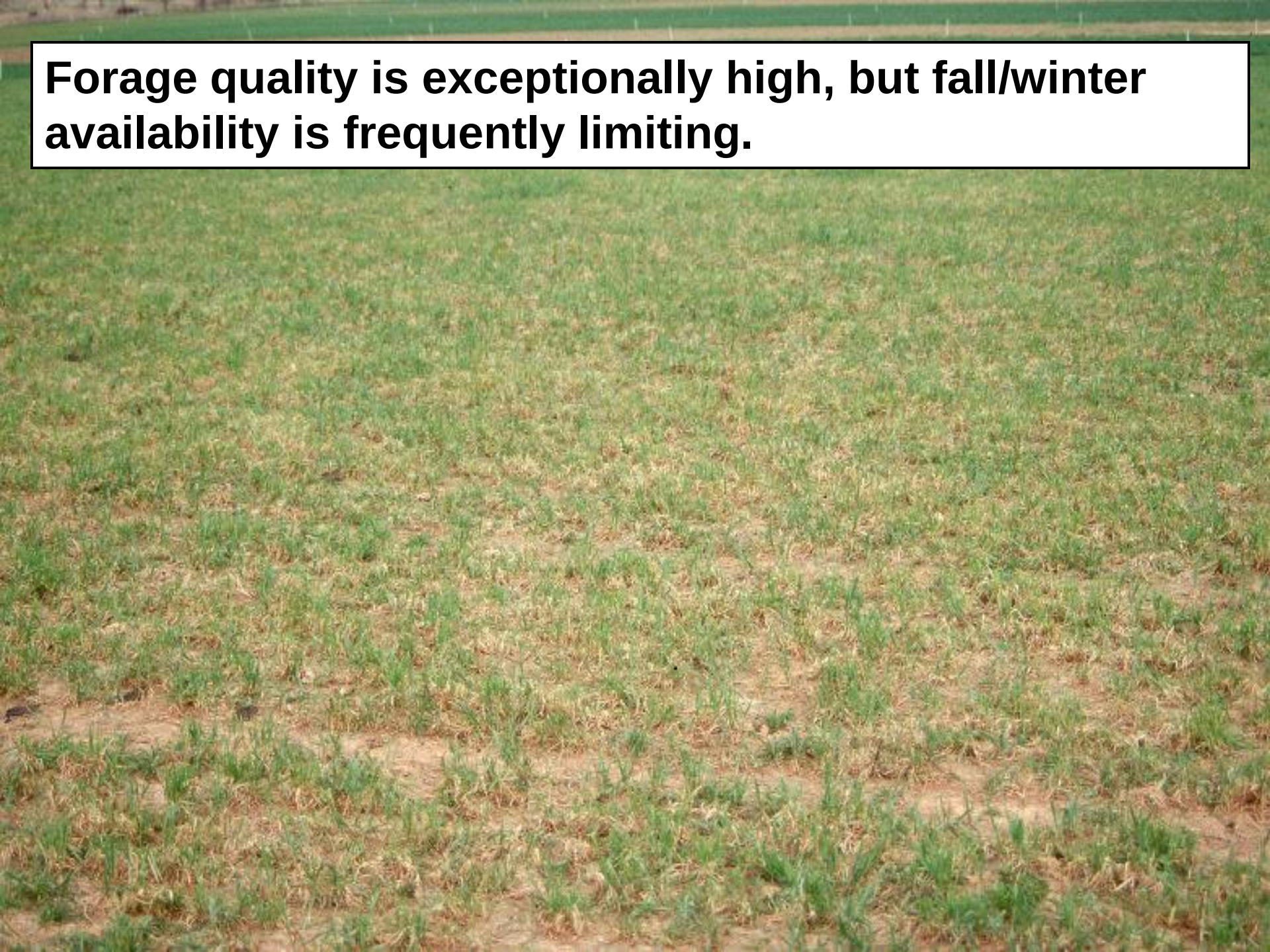
In Oklahoma, wheat is used primarily as a dual-purpose (forage and grain) crop, but across the border in Arkansas these production practices are completely segregated.


Forage quality is exceptionally high, but fall/winter availability is frequently limiting.

Description of Forages

Species	Variety	Type	Origin
Oat	Horizon 474	winter	U of Florida
	Blaze	spring	U of Illinois
Wheat	AR 910*	soft-red winter	U of Arkansas
	OK 101	hard-red winter	Oklahoma State U
	Armor Prograze	winter	Cullum Seeds
Triticale	Monarch	winter	U of Florida
Rye	AGS 104	winter	U of Florida
	Wintergrazer 70*	winter	Pennington Seed

* Now marketed by Delta King (McCrory, AR) as GR 9108.

Blaze (spring) Oat

Horizon 474 (fall) Oat

December 14, 2004

AGS 104 Rye

Wintergrazer 70 Rye

December 14, 2004

AR 910 Wheat (soft red)

OK 101 Wheat (hard red)

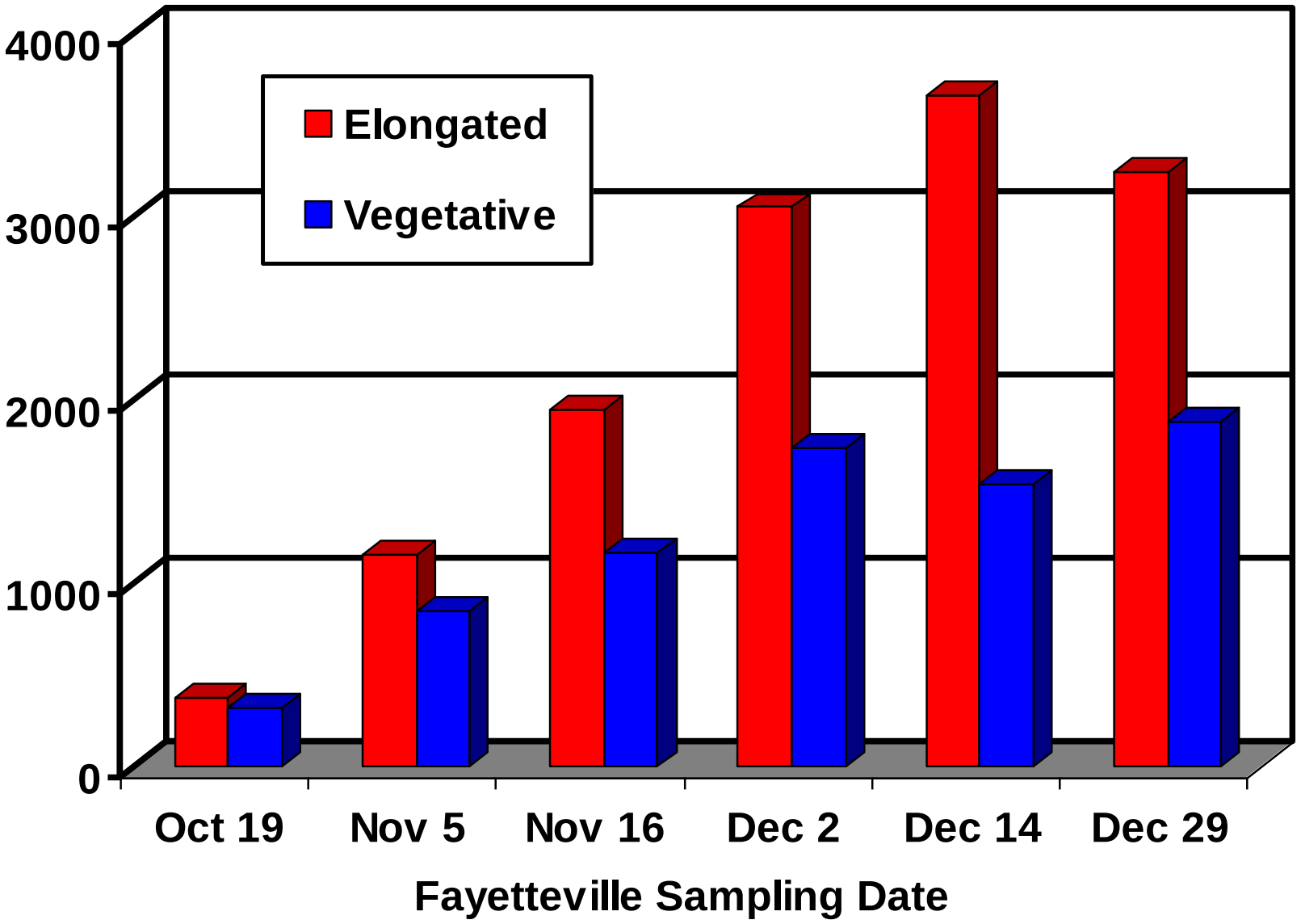
December 14, 2004

Elongated vs. Vegetative
(Gunsaulis et al., 2008)

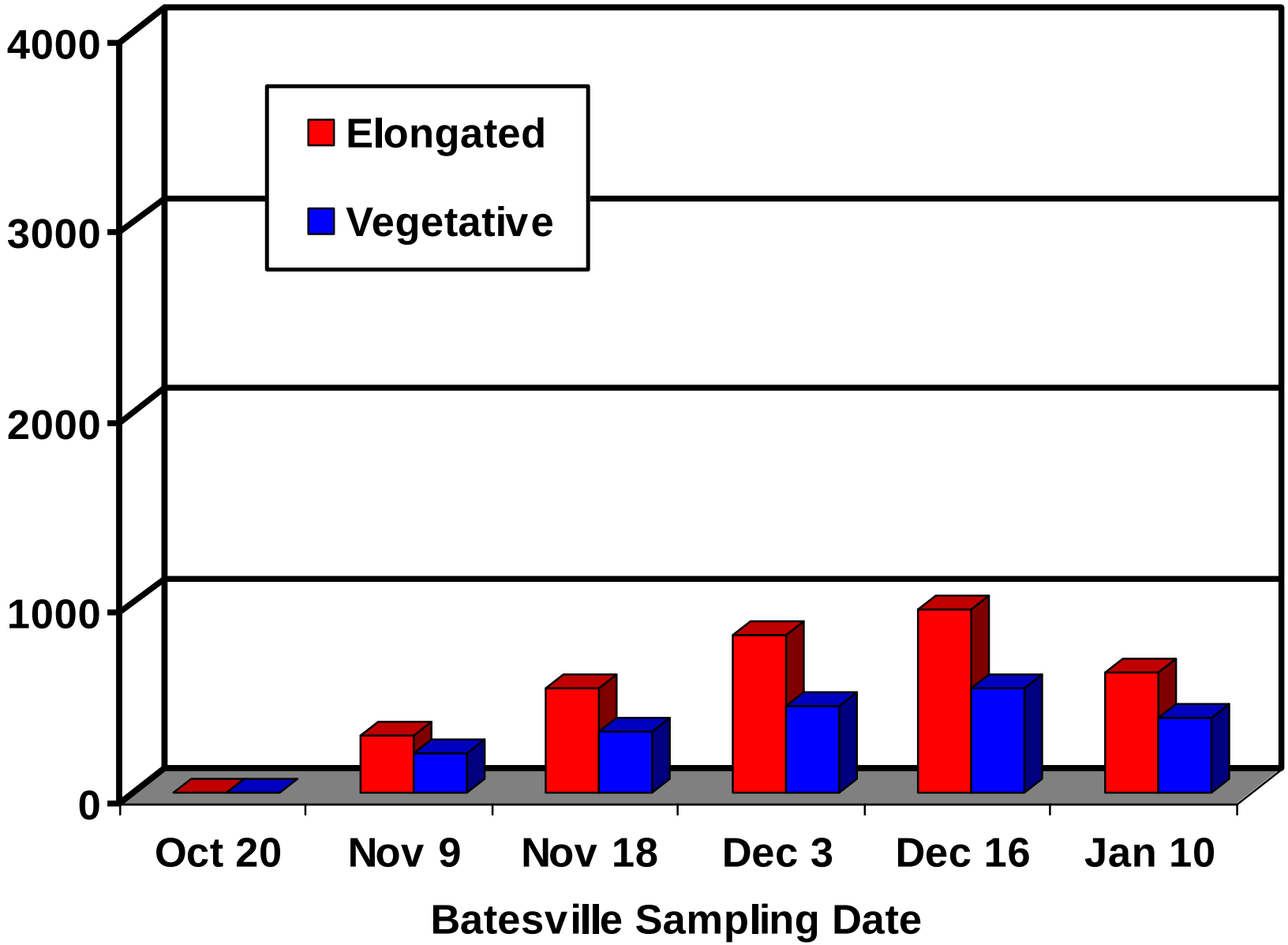
Elongated	*Vegetative*
• Horizon 474 oat	👍 AR 910 wheat
• Blaze oat	👍 OK 101 wheat
• Monarch triticale	👍 Armor wheat
• AGS 104 rye*	👍 Wintergrazer 70 rye

*** Approximately three elongated tillers per foot of drill row.**

Fall DM Yield (lbs/acre) – Fayetteville (AR) 2004



Fall DM Yield (lbs/acre) – Batesville (AR) 2004



← Blaze Spring Oat

(regrowth)

February 15, 2005

Horizon Fall Oat →

(regrowth)

February 15, 2005

← OK 101 Wheat

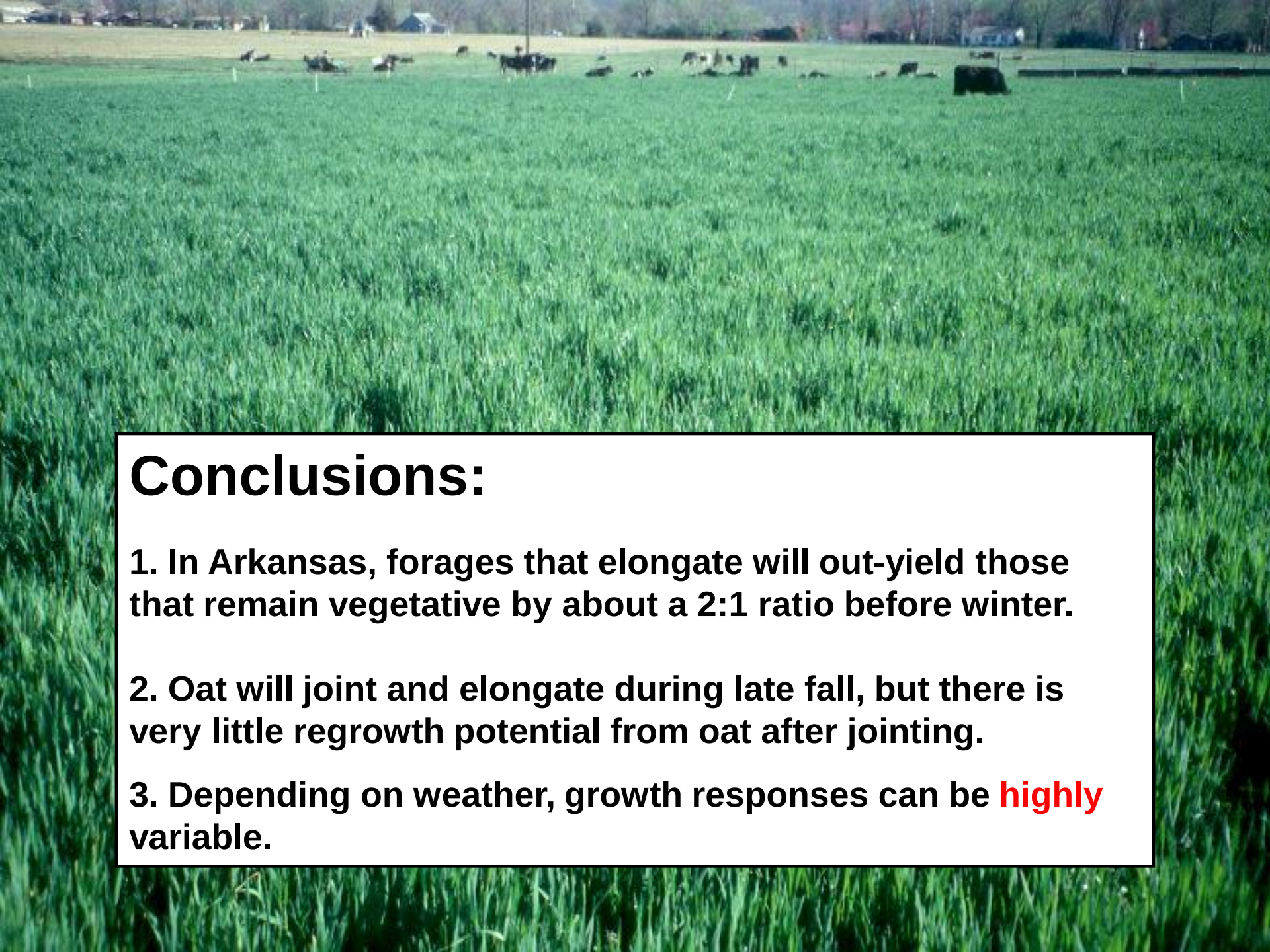
(regrowth)

February 15, 2005

Armor Prograze Wheat →

(regrowth)

February 15, 2005



Conclusions:

1. In Arkansas, forages that elongate will out-yield those that remain vegetative by about a 2:1 ratio before winter.

2. Oat will joint and elongate during late fall, but there is very little regrowth potential from oat after jointing.

3. Depending on weather, growth responses can be highly variable.


W I S C O N S I N
DOUGLAS
BAYFIELD
ASHLAND
IRON
VILAS
FLORENCE
FOREST
ONEIDA
PRICE
SAWYER
WASHBURN
BURNETT
POLK
BARRON
RUSK
LINCOLN
LANGLADE
TAYLOR
MARATHON
SHAWANO
MENOMINEE
OCONTO
MARINETTE
DOOR
KEWAUNEE
BROWN
OUTAGAMIE
WAUPACA
PORTAGE
WOOD
CLARK
CHIPPEWA
DUNN
ST CROIX
PIERCE
PEPIN
EAU CLAIRE
BUFFALO
TREMPEALEAU
JACKSON
MONROE
LA CROSSE
VERNON
JUNEAU
ADAMS
WAUSHARA
MARQUETTE
GREEN LAKE
WINNEBAGO
CALUMET
MANITOWOC
SHEBOYGAN
FOND DU LAC
DODGE
COLUMBIA
SAUK
RICHLAND
CRAWFORD
GRANT
IOWA
DANE
MADISON
JEFFERSON
WAUKESHA
WASHINGTON
OZAUKEE
MILWAUKEE
LAFAYETTE
GREEN
ROCK
WALWORTH
RACINE
KENOSHA
GOGEBIC
ONTONAGON
HOUGHTON
BARAGA
MARQUETTE
DICKINSON
DELTA
MENOMINEE
Duluth
Superior
Green Bay
Milwaukee
LAKE MICHIGAN

?

Grazing Systems/Management: Comparisons of Autumn and Spring-Seeded Oats at 77 d Post-Seeding (Contreras-Govea and Albrecht, 2006)

	Autumn[1]	Spring/Summer
Yield (Mg/ha)	6.7	7.7
Crude Protein, %		
Leaf	24.3	22.0
Stem	11.5	9.0
Whole Plant	18.0	13.5
NDF, %		
Leaf	42.6	46.8
Stem	56.5	70.7
Whole Plant	52.1	59.6
Water Soluble CHO, %		
Leaf	10.3	6.4
Stem	22.1	6.7

[1] Significant effect of season for all response variables ($P \leq 0.05$).

Prairie du Sac, WI

2006-2007

Wheat

Hopewell

Kaskaskia

Triticale

Trical 2700

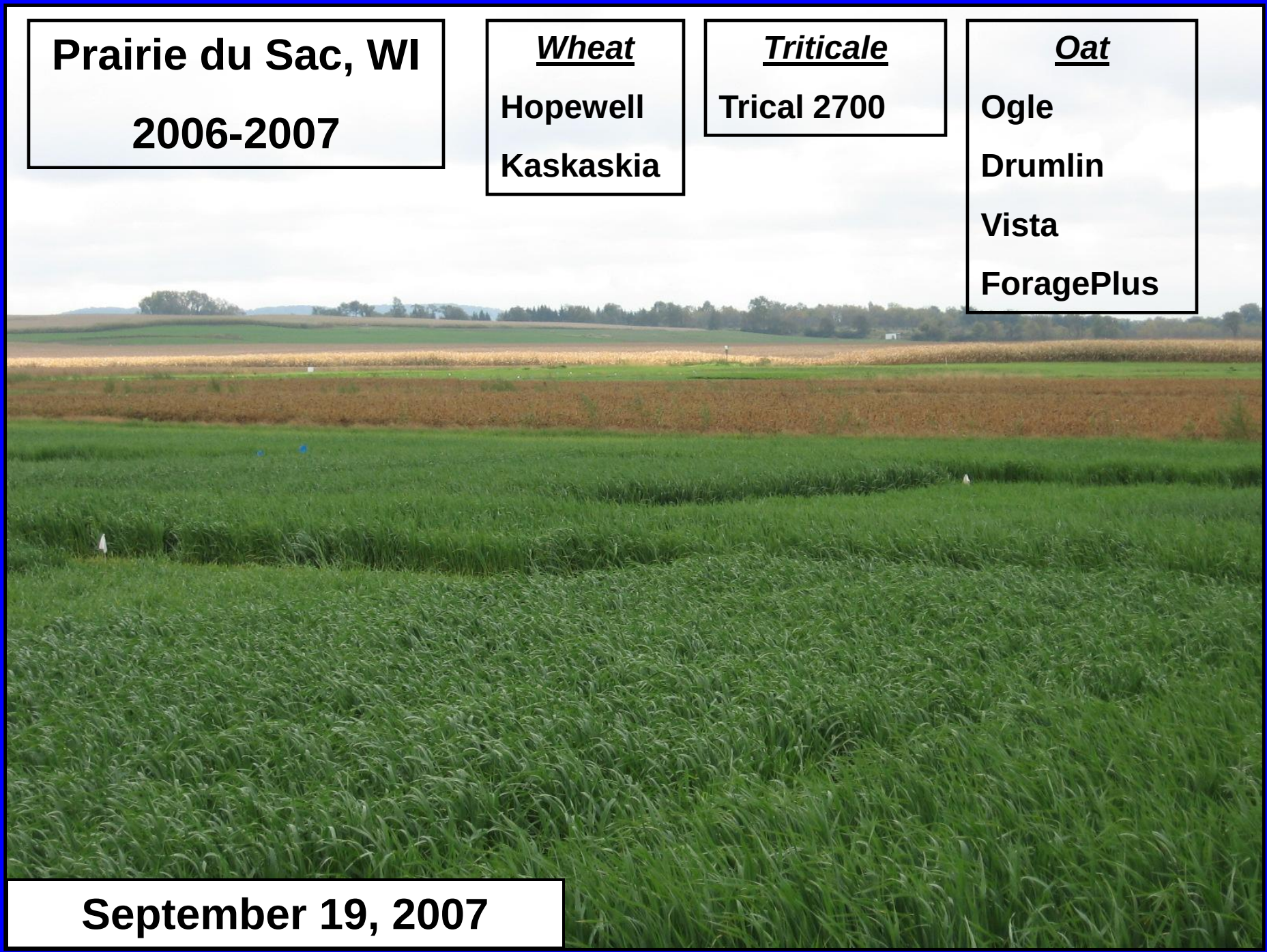
Oat

Ogle

Drumlin

Vista

ForagePlus



September 19, 2007

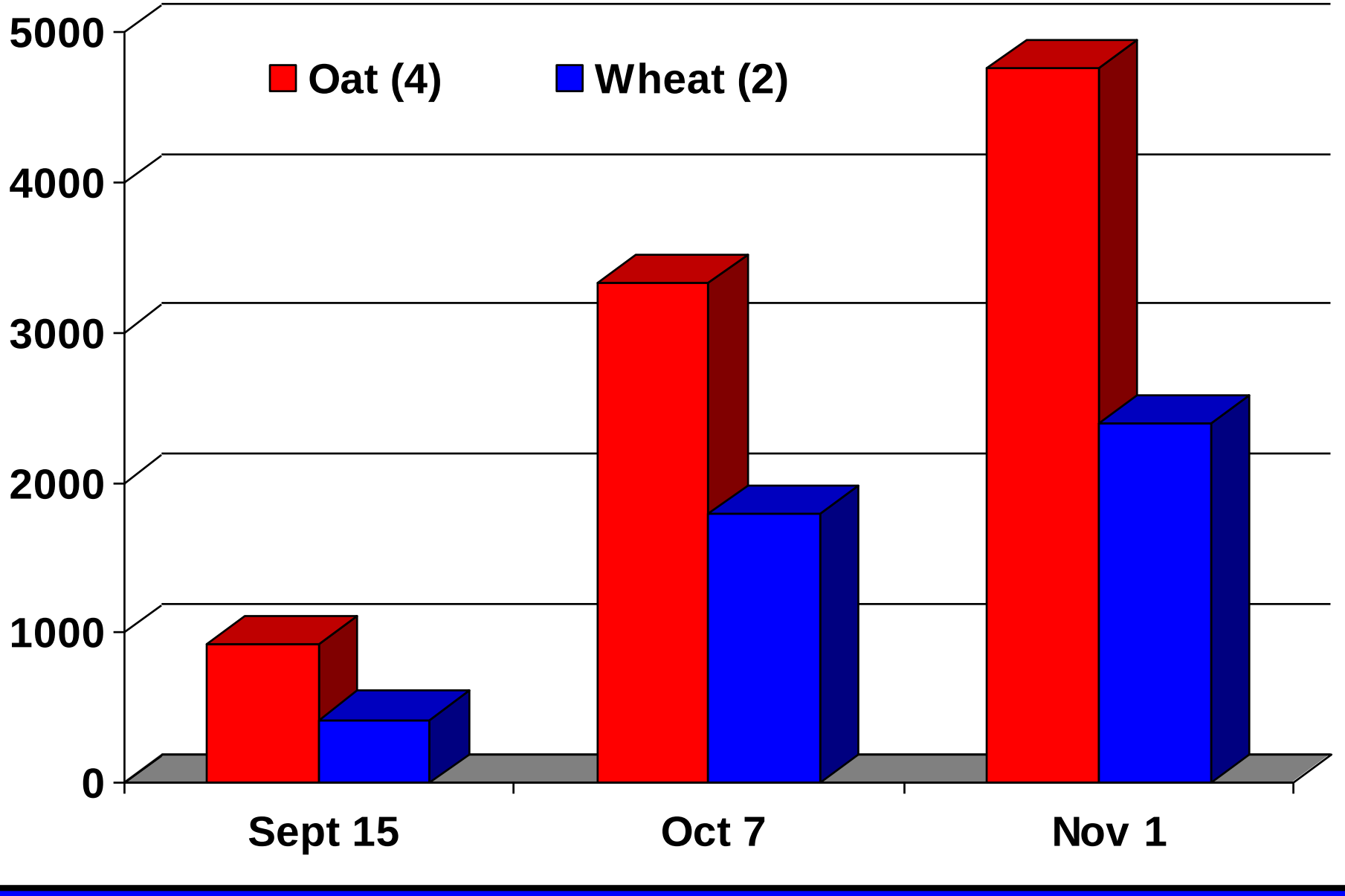
15 September 2006

30 October 2006

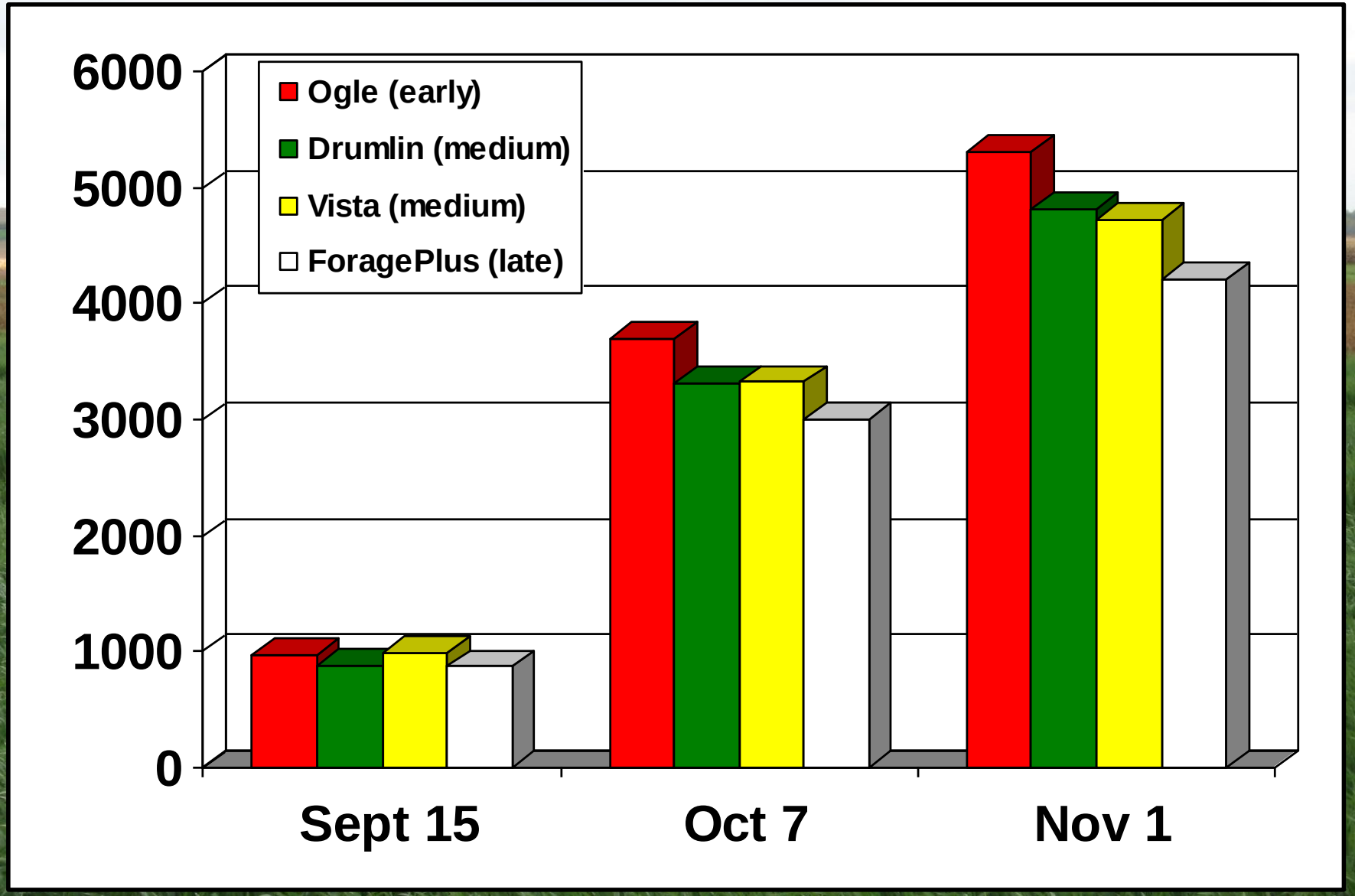
19 September 2007

19 September 2007

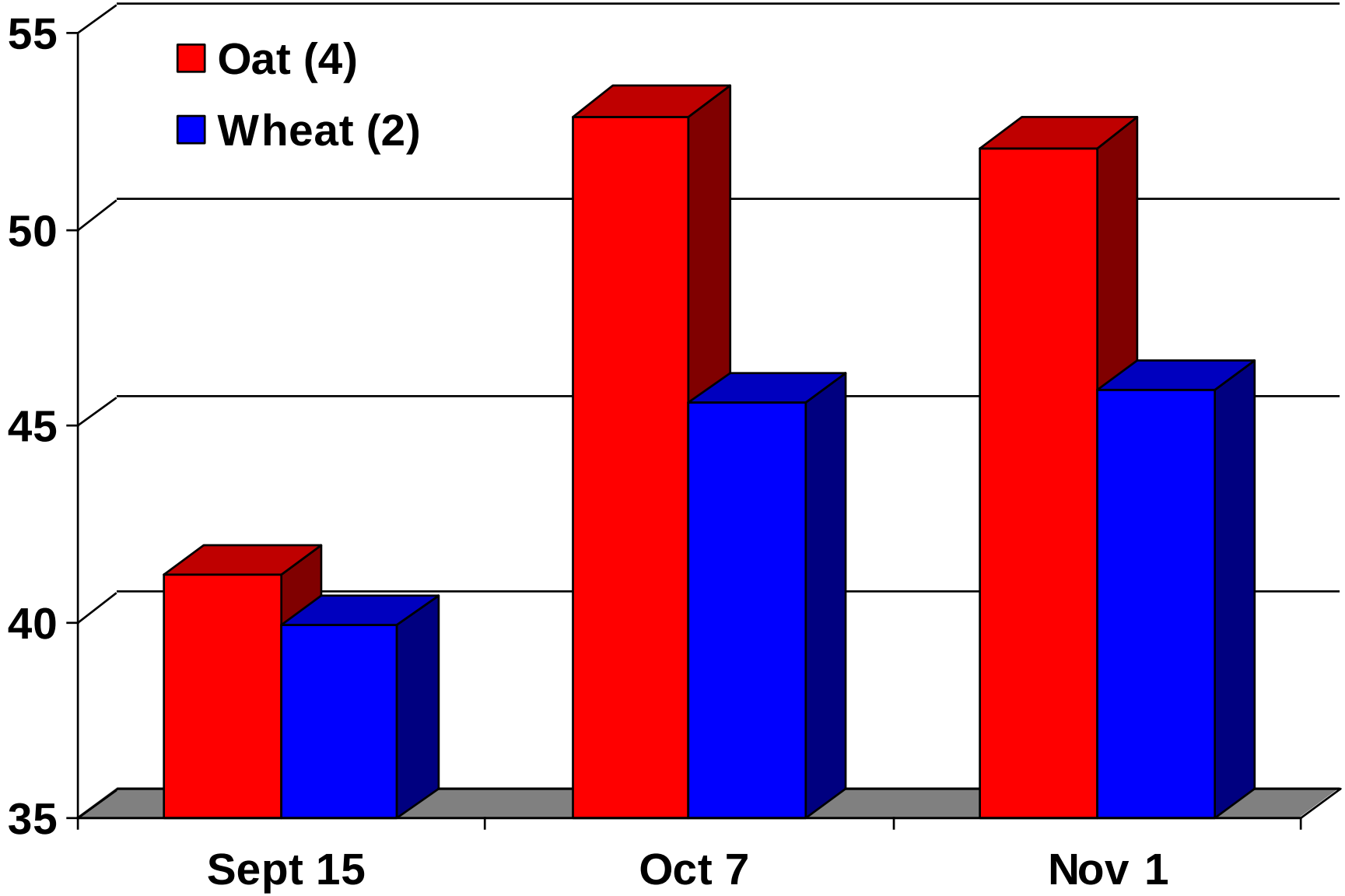
DM Yield (kg/ha) – Prairie du Sac, WI (2006-2007)



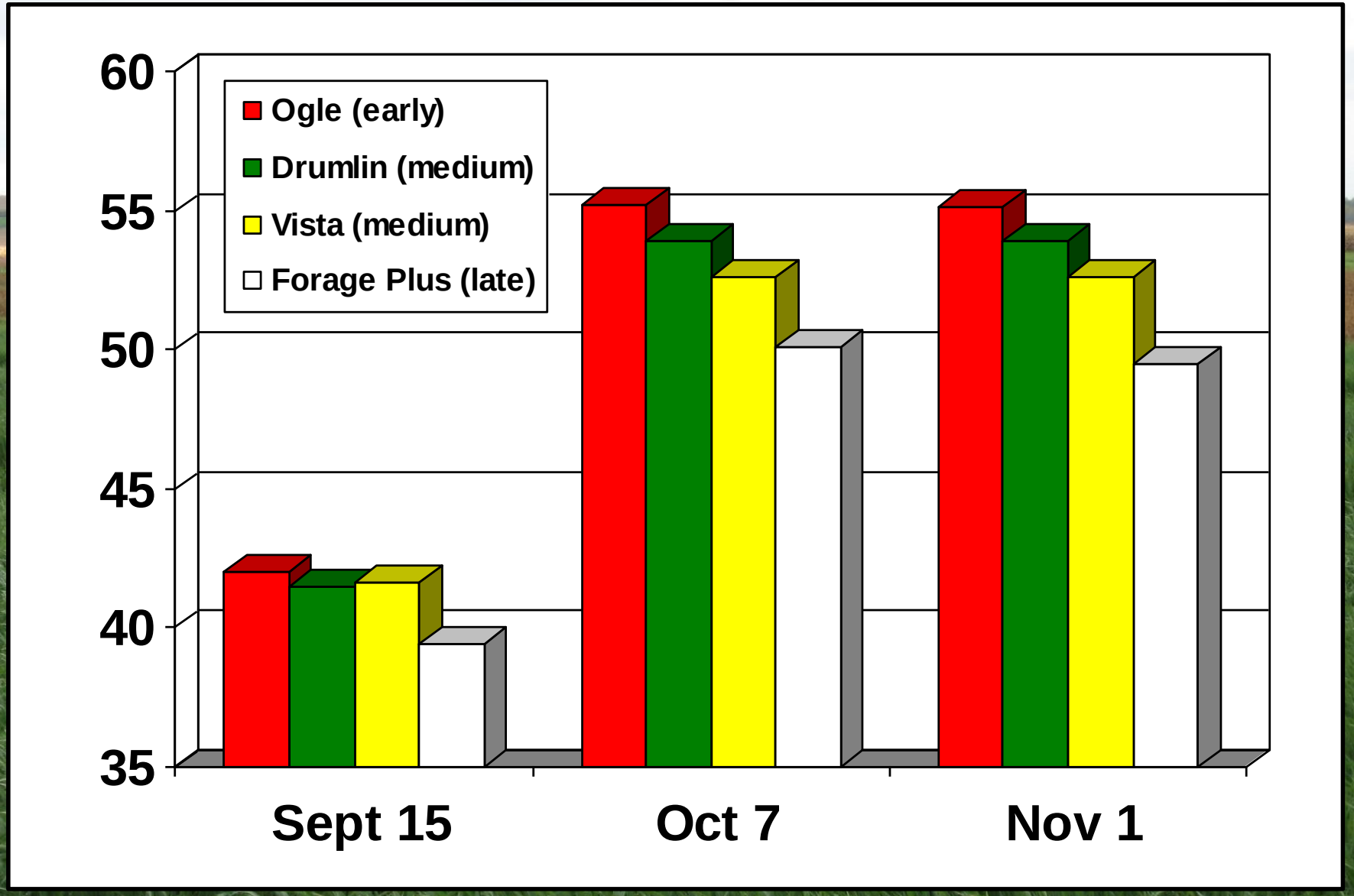
Fall Forage Yield of Oat Cultivars at Prairie du Sac, WI (2006-2007)



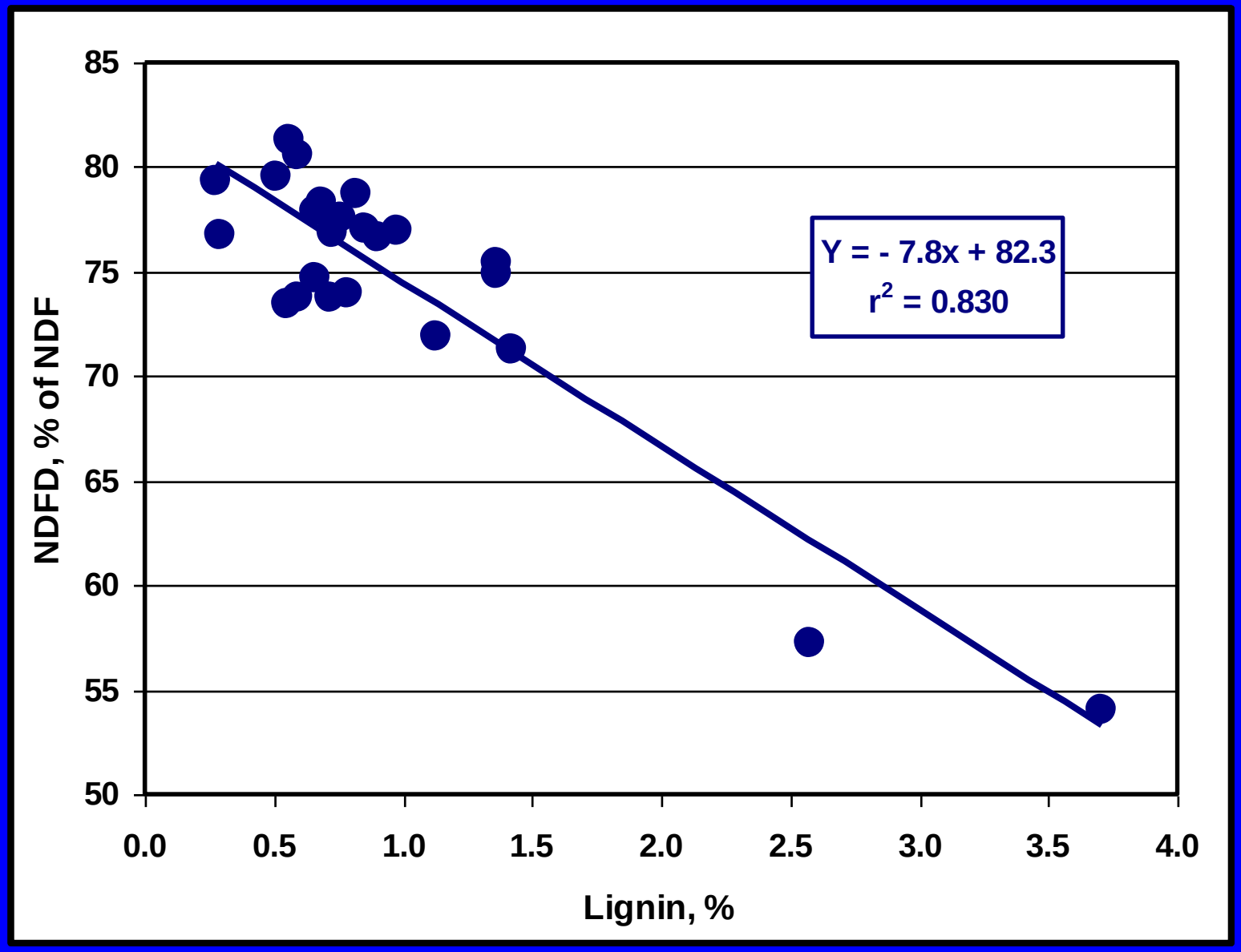
NDF (%) – Prairie du Sac, WI (2006-2007)

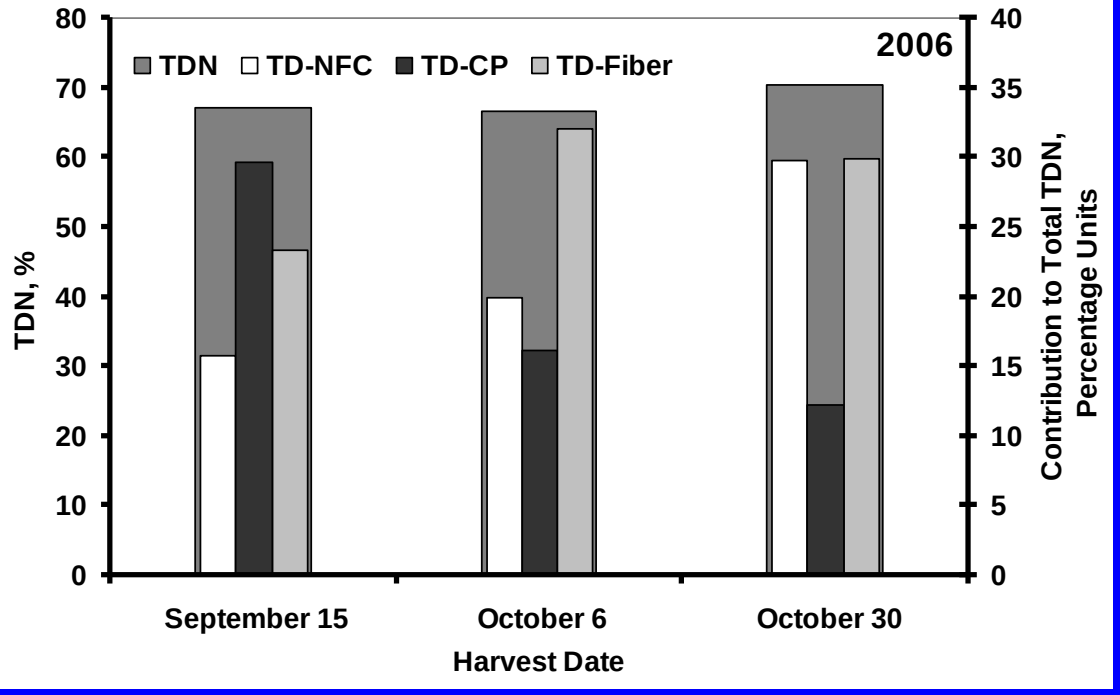


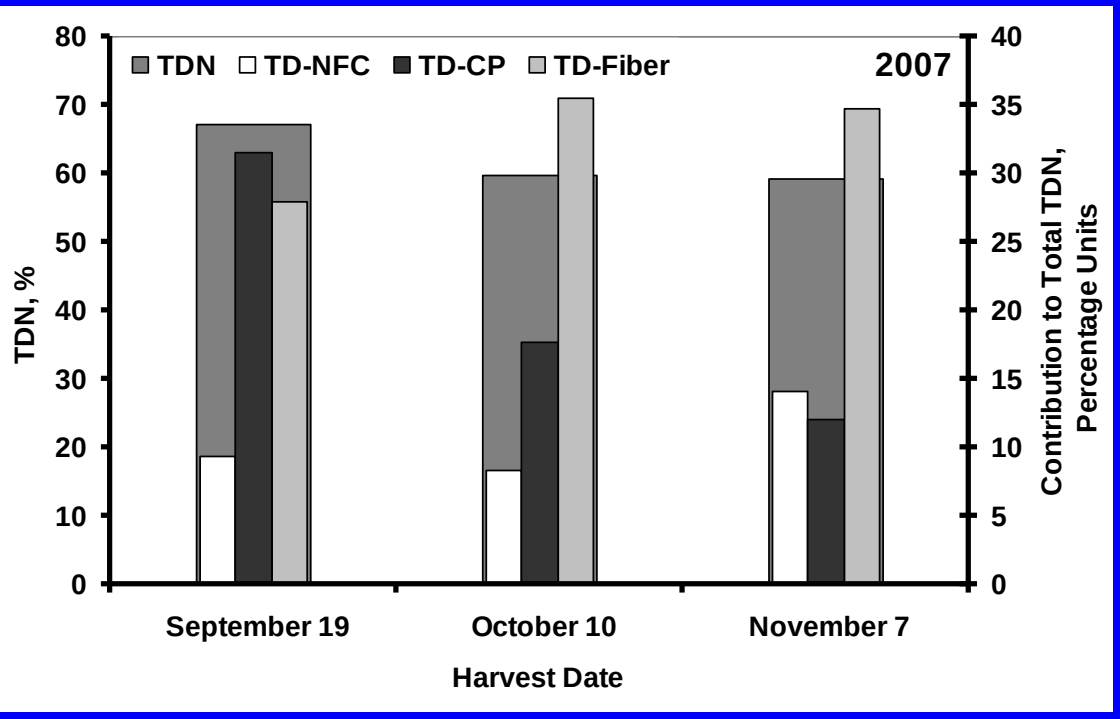
NDF (%) for Oat Cultivars at Prairie du Sac, WI (2006-2007)



48-h NDFD (% of NDF) vs. Acid-Detergent Lignin







2006

15 Sep – vegetative

6 Oct - 3 nodes

30 Oct - 4 nodes

TDN and TDN Components

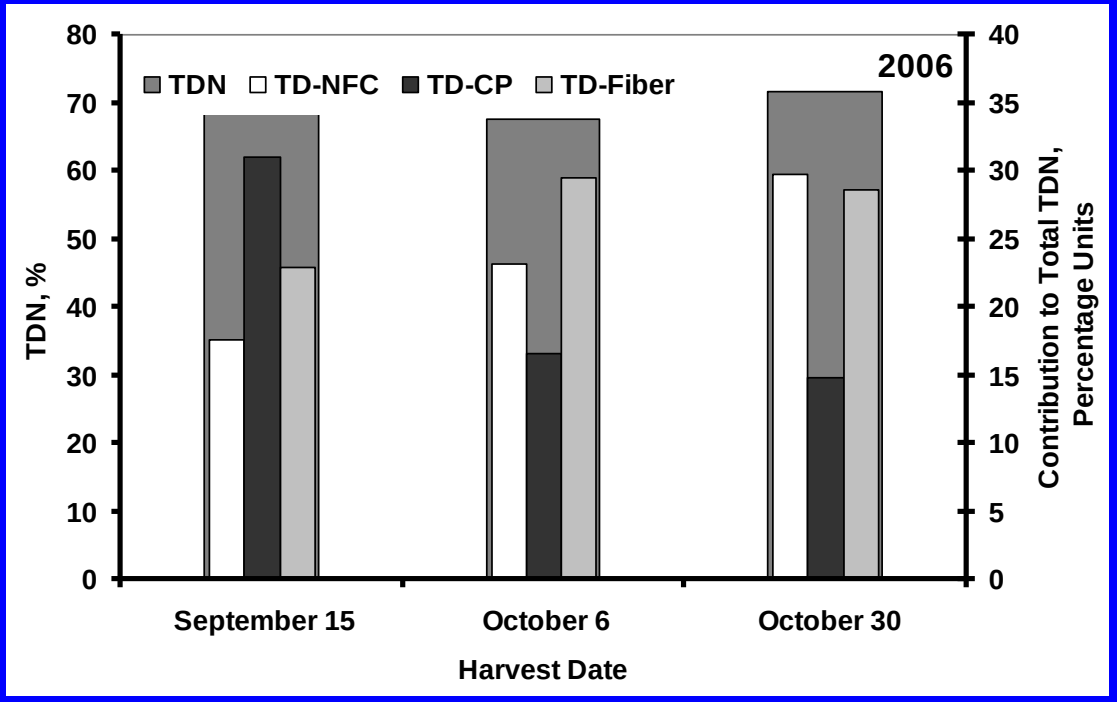
Ogle Oat

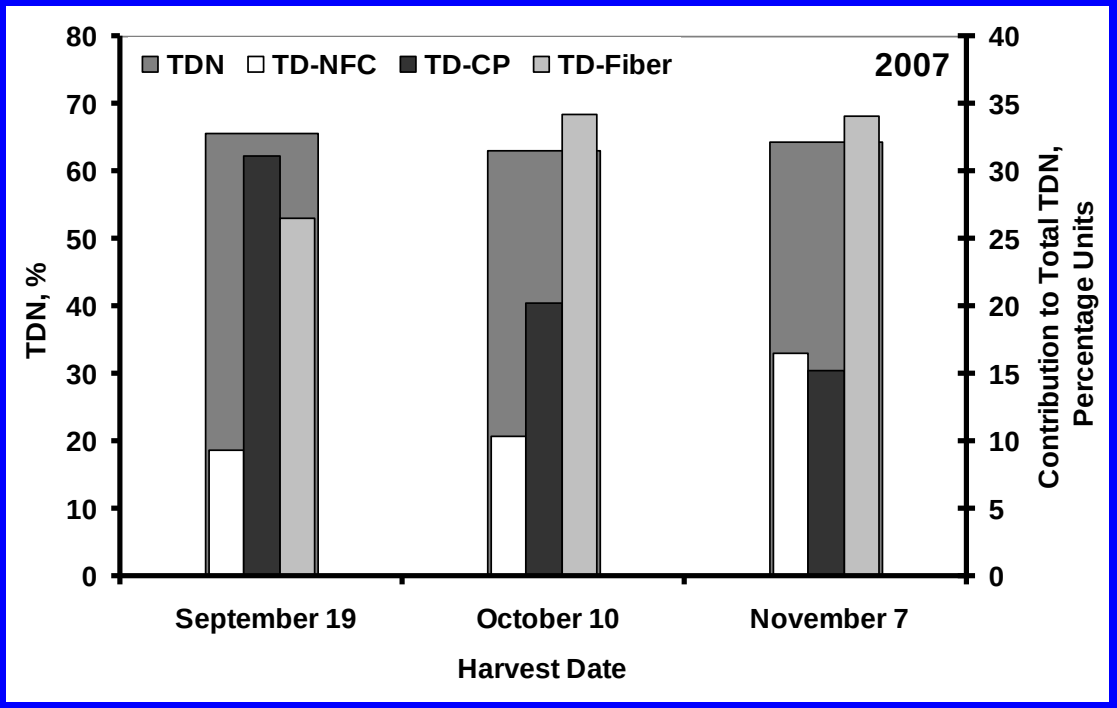
2007

19 Sep – 1 node

10 Oct - early boot

7 Nov - heading





2006

15 Sep – vegetative

6 Oct - 2 nodes

30 Oct - 2 nodes

TDN and TDN Components

ForagePlus Oat

2007

19 Sep – 1 node

10 Oct - 4 nodes

7 Nov – 5 nodes

Conclusions:

1. In Wisconsin, cereal-grain forages that elongate during fall will out-yield those that remain vegetative by about a 2:1 ratio before winter.

2. There is very little regrowth potential from oat, especially after jointing occurs.

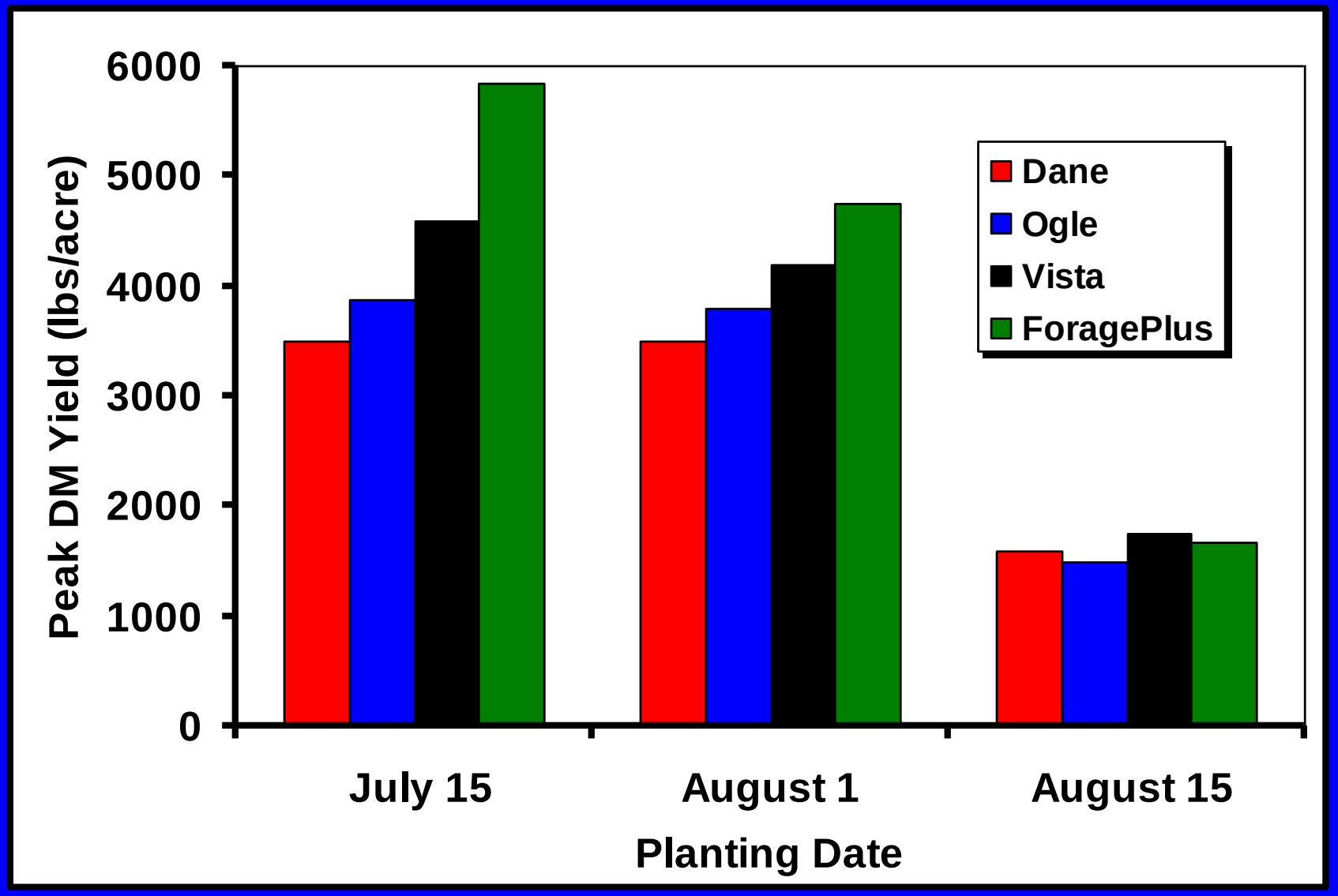
3. With a planting date about 10 August, there appears to be a yield drag associated with slow-maturing oat cultivars.

4. Fall-grown oat cultivars exhibit different quality characteristics than observed with spring planting dates

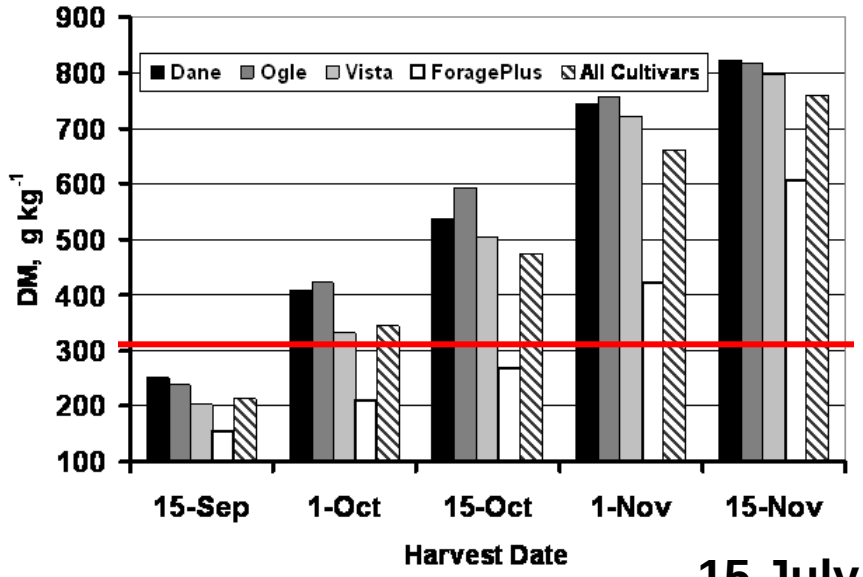
- **lower NDF**
- **lower lignin**
- **greater nonfiber carbohydrates (sugars)**
- **greater DM and fiber digestibility**
- **relatively stable estimates of TDN**

So ….. Which Cultivar Do I Plant ? And When?

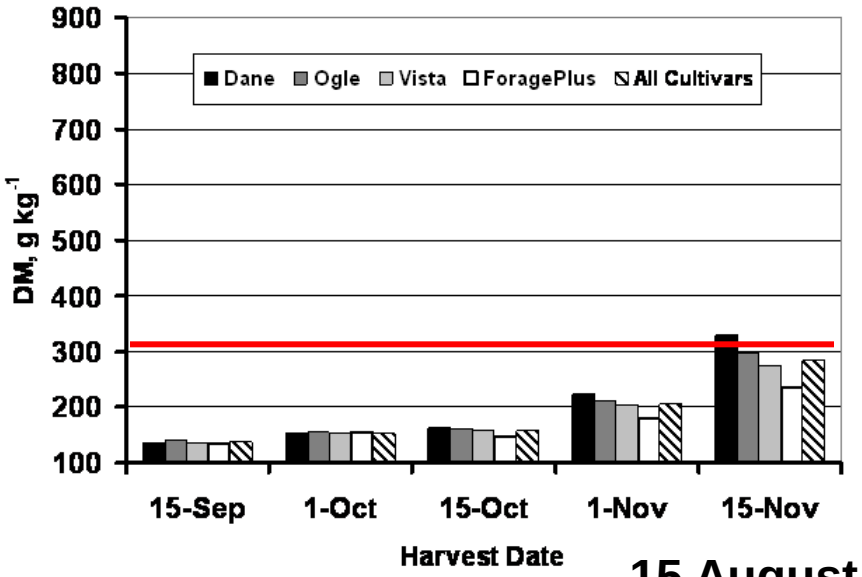
Effects of Planting Date and Oat Cultivar on Peak Yield of Fall-Grown Oat (Marshfield, WI; 2007-2009)



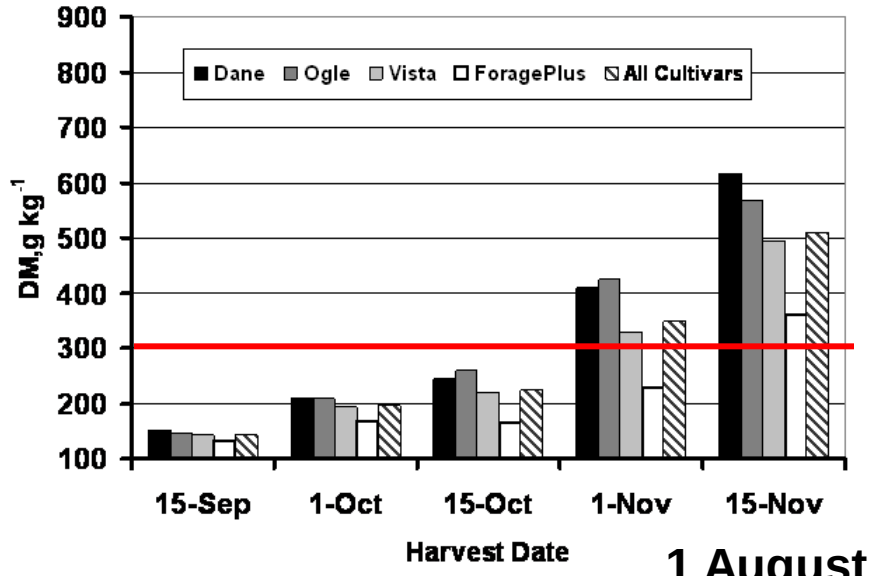
October 1, 2008



15 July

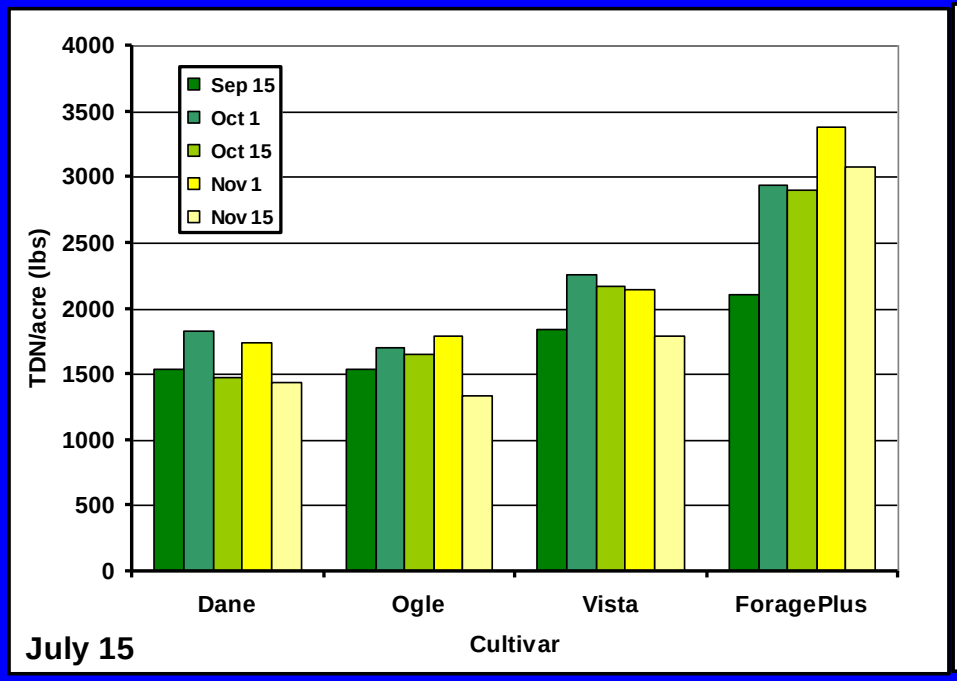


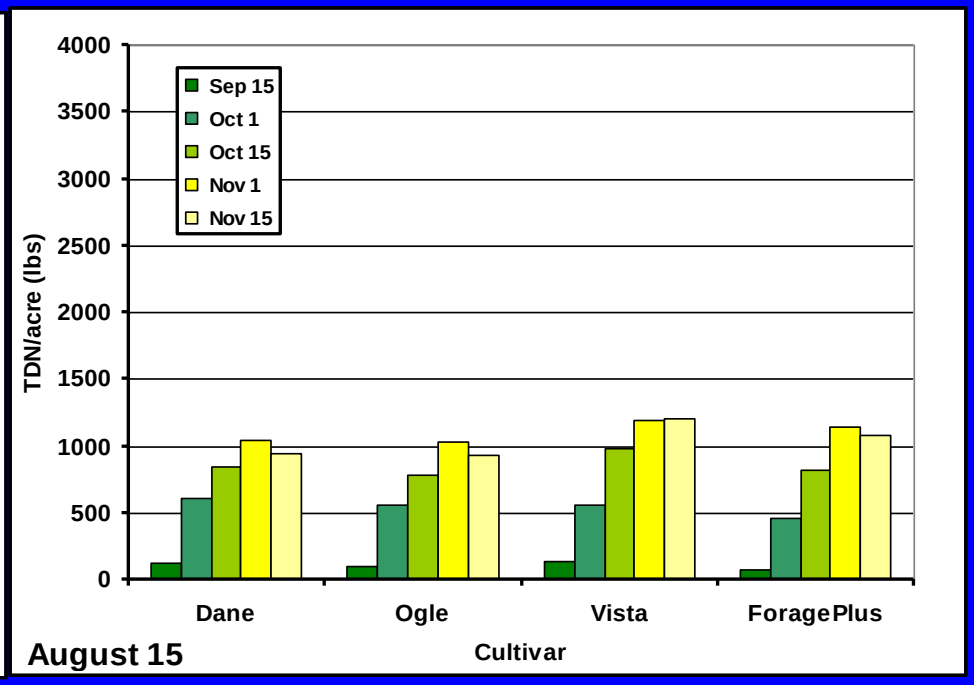
15 August

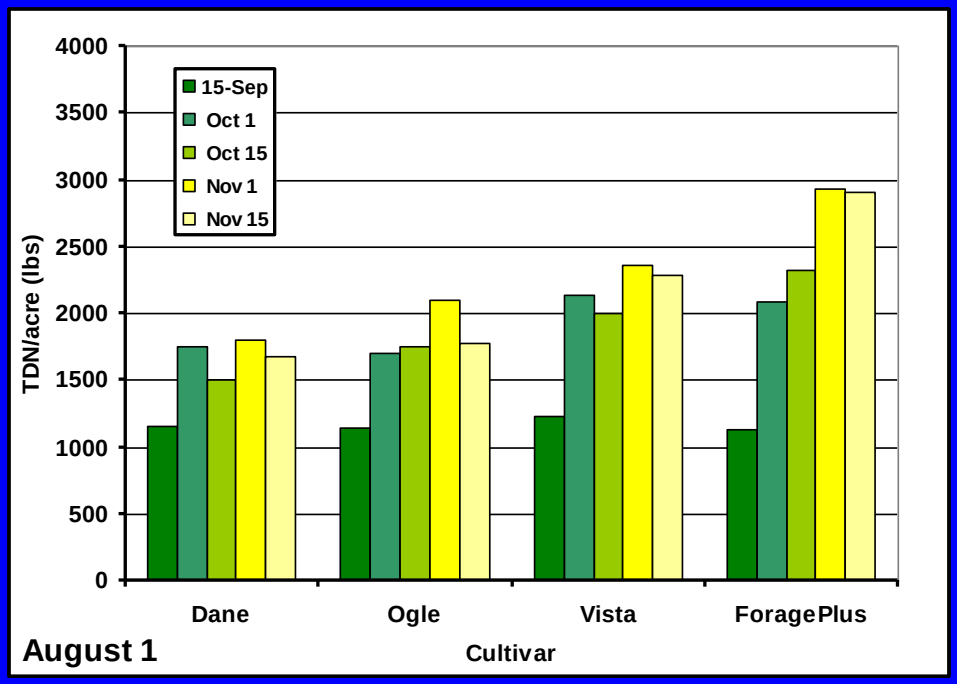


1 August

Effects of Harvest Date on DM Concentration

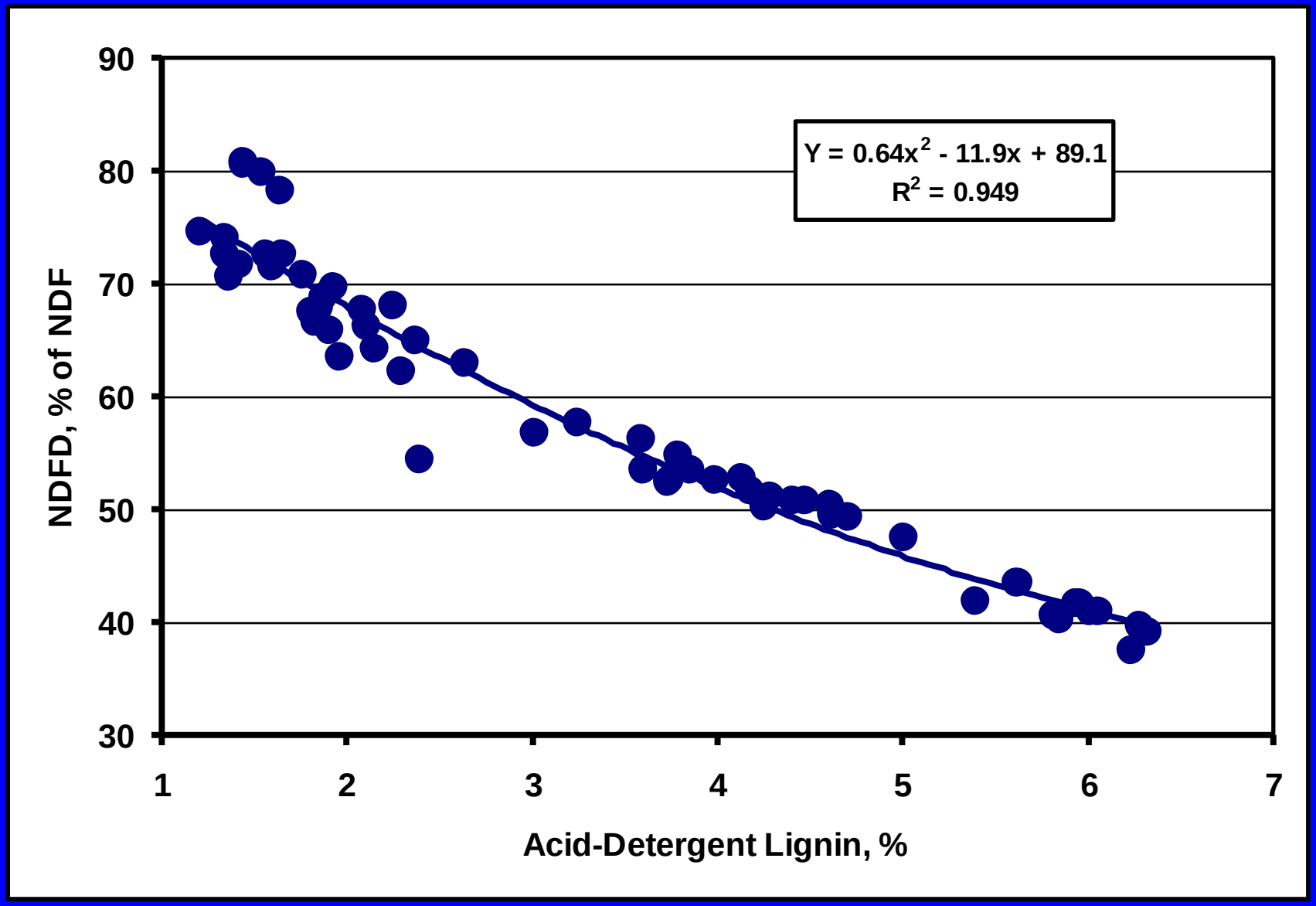






Effects of Cultivar and Harvest Date on TDN Per Acre (2007-2009)

48-h NDFD (% of NDF) vs. Acid-Detergent Lignin



Conclusions

1. ForagePlus (forage-type) oat is likely to maximize both yield and nutritive value throughout central Wisconsin when planting dates are extended as late as the first week of August.

2. Delayed morphological development allows ForagePlus to benefit more extensively from the physiological process of hardening, in which plants accumulate solutes, especially sugars.

3. These accumulations of sugar tend to stabilize concentrations of NDF, in vitro digestibility, and TDN over late-fall harvest dates.

4. With late establishment (second week of August), the slower developmental rate of ForagePlus becomes an increasing liability.

5. Following late establishment, grain-type cultivars will often out-yield ForagePlus, and differences in nutritive value are much less distinct.

Questions?

U.S. Dairy Forage Research Center